DR.-ING. WOLFRAM SCHLIMME
DIPL.-ING., DIPL.-WIRTSCH.-ING

PATENTANWALT
EUROPEAN PATENT ATTORNEY
EUROPEAN TRADE MARK ATTORNEY

Applicant:
scil animal care company GmbH
Robert-Bosch-Straße 5 a

D - 68519 VIERNHEIM

ROSENHEIMER LANDSTR. 115
D - 85521 OTTOBRUNN

TELEPHONE 089 - 60 900 69
TELEFAX 089 - 60 900 60
TELEX 210 113 patws d
E-MAIL wspatent@globalegis.com

Ottobrunn 19 February 1999
Official file reference:
Attorney's file: S 1055

System and method for identifying and authenticating accessories, auxiliary and/or operating substances for items of equipment

The invention relates to a system for identifying and authenticating accessories, auxiliary and/or operating substances for items of equipment. It further relates to a method for detecting and decoding information stored on an optically readable data carrier portion.

It is often the case that accessory parts or auxiliary substances or operating substances for items of equipment are produced and distributed not only by the manufacturer of the item of equipment but also by third-party suppliers. Such products from third-party suppliers often do not meet the high quality and safety requirements of the manufacturer of the item of equipment but can be used in conjunction with the item of equipment without major technical problems. For the manufacturer of an item of equipment, it is generally difficult to ensure the reliability and safety of the equipment if such accessory products or auxiliary or operating substances from third-party suppliers are used, since the decision on the use of such third-party supplier products generally lies with the user of the equipment.

It is therefore not only in the interest of the equipment manufacturer but also in the interest of the users of such equipment if it can be reliably ensured that equipment can be used only with accessories authorized by the equipment manufacturer and with auxiliary or operating substances authorized by the equipment manufacturer.

It is therefore the object of the present invention to provide a marking for accessories and auxiliary or operating substances or their storage containers as well as an identification system which allow a clear identification or authorization by the manufacturer of an item of the equipment and which allow the proliferation of unauthorized accessories or unauthorized auxiliary or operating substances to be prevented.

This object is achieved by the system specified in Claim 1.

The provision of the information that can be detected by the human eye and is distinctive to a human viewer on the accessories or the auxiliary or operating substances or their storage containers and of the reading and evaluating device for this information on the item of equipment makes it possible for the equipment to inspect, preferably likewise visually, whether the information provided on the data carrier portion coincides with a prescribed item of information stored in the equipment, so that operation of an item of equipment is made possible only if they coincide. This authentication function of the system according to the invention is supplemented by the detectability of information by the human eye and by its property of being distinctive to a human viewer, generally directly, that is to say without prolonged viewing. Consequently, the user can initially check with his own

eyes whether the accessories or auxiliary or operating substances are products authorized by the manufacturer.

It is advantageous in particular if the information that can be detected by the human eye and is distinctive to the human viewer is formed by a trademark. If use of the item of equipment with the accessories or the auxiliary or operating substances is in this case only authorized if the trademark detectable by the human eye, generally a registered and protected mark of the manufacturer, is provided on the data carrier portion, the manufacturer can prevent the distribution of unauthorized accessories or unauthorized auxiliary or operating substances for the item of equipment directly on the basis of a trademark infringement, since an unauthorized third-party manufacturer must use the otherwise protected trademark in an unallowed way to ensure operability. Instead of a trademark, an otherwise protected graphic or typographic element may also be provided.

If the data carrier portion has a first region, in which only machine-readable information is stored, and a second region, in which the information that can be detected by the human eye and is distinctive to the human viewer is stored, it is possible to provide on the data carrier portion, in addition to the information that can be detected by the human eye, data which can likewise be read and evaluated by the reading and evaluating device of the item of equipment, this data having for example technical data of the product, in other words of the corresponding accessories or of the corresponding auxiliary or operating substance. In this case, the first region may contain a variable, product-dependent item of information, while the second region comprises a static manufacturer-dependent item of information, which is the same for all products.

It is preferable if at least one reference marking for the orientation of the reading device is provided on the data carrier portion. As a result, reliable detection of the data on the data carrier portion is ensured, even if the data carrier portion is moved past the reading device in different positions.

It is also preferable if the information stored on the first region of the data carrier portion is formed by a machine-readable code and the information stored on the second region of the data carrier portion is formed by a trademark.

In a further preferred embodiment, the first region of the data carrier portion has a multiplicity of lines of a binary pixel code, the binary pixel code containing a plurality of lines of the only machine-readable information, and the second region of the data carrier portion has a plurality of lines of a pixel code which together form the information that can be detected by the human eye and is distinctive to the human viewer.

The line-by-line binary pixel code in the first region provides a coding capability which allows a very high data density per unit area of the data carrier portion.

The representation of the information that can be detected by the human eye and is distinctive to the human viewer as a line-by-line pixel code facilitates the evaluation of the information of the data carrier portion, which in this way can be performed with one and the same reading and evaluating device for the first region and the second region.

It is preferred if a machine-readable limit marking, which preferably comprises at least one blank line, is provided between the first region of the data carrier portion and the second region of the data carrier portion. This provides a clear delimitation of the

first region and second region both for the human eye and for the reading device.

It is also preferred if the reference marking has a frame reaching around at least one of the two regions of the data carrier portion.

To facilitate reading out, the binary pixel code of a line has in each case a row of adjacently lying bit markings of the binary representation of an item of information.

It is preferred if, to increase reading-out reliability, binary bit markings for a check digit for the binary representation of the information are additionally provided in each line.

A method for detecting and decoding information provided on an optically readable data carrier portion of a system according to one of Claims 1 to 10, the information being detectable by the human eye and distinctive to a human viewer, comprises the steps: registering the optical information present on the data carrier portion, reading out the optical information present on the data carrier portion, comparing the read-out information with a stored information sample and generating an authenticating signal if the read-out information of the second region has been detected as coinciding with the stored information sample.

An alternative method for detecting and decoding information provided on an optically readable data carrier portion of a system according to one of Claims 1 to 10, at least part of the information being detectable by the human eye and distinctive to a human viewer, comprises the steps: registering the optical information present on the data carrier portion, preferably identifying the reference marking, identifying the first and second regions of the data

carrier portion, reading out and decoding the binary information contained in the first region, reading out the information contained in the second region, comparing the read-out information of the second region with a stored information sample and generating an authenticating signal if the read-out information of the second region has been detected as coinciding with the stored information sample.

The invention is explained in more detail below on the basis of an example with reference to the drawings, in which:

Figure 1 shows the schematic structure of a system according to the invention,

Figure 2 shows a data carrier portion of a system according to the invention and

Figure 3 shows a block diagram of the system according to the invention.

Figure 1 is a schematic representation of an item of equipment 10, which has a receptacle 12 for a storage container 16 containing an auxiliary substance 14. The item of equipment is, for example, an analyzer for the automatic analysis of chemical or biological specimens, the auxiliary substance being formed by a reagent which is used for the analysis of a specific specimen (not shown) in the item of equipment 10.

The storage container 16 is provided in its upper region with a data carrier portion 18, which is explained in further detail below with reference to Figure 2. Provided on the item of equipment 10 is a reading and evaluating device 20, which has for example a video camera or a fixed video camera, the lens 22 of which is directed at the data carrier portion 18.

In Figure 2, the data carrier portion 18 is reproduced in a greatly enlarged form. The data carrier portion 18 has a first region 24, in which a machine-readable item of information is stored. Furthermore, the data carrier portion 18 has a second region 26, in which an item of information that can be detected by the human eye and is distinctive to the human viewer is stored. In the example of Figure 2, this is the sequence of letters "SCIL".

Provided as a limit marking 28 between the first region and the second region is a blank line, in which no binary information is stored. The first region 24 and the second region 26 as well as the limit marking 28 are together surrounded by a frame forming a reference marking 30.

The first region 24 comprises a multiplicity of lines, 32, 32', 32'' of a binary pixel code, which has a multiplicity of columns 34, 34', 34'' per line, each combination of line and column representing a pixel location which, either by a white pixel or a black pixel, contains an item of binary optical information. Provided at the right-hand end of the lines are three columns 36, 36', 36'', which, in each case in combination with a line, contain a binary code of a check digit for the respective line.

In the present example, a white bit marking 38 denotes the binary value "0", whereas a black bit marking 40 denotes the binary value "1".

In the second region 26, the letters "SCIL" are formed by corresponding line-by-line binary markings, the totality of the lines in the second region 26 forming a combination of letters "SCIL" that can be detected by the human eye and is distinctive to a human viewer. Instead of letters, a graphic representation, for

example a logo, may be depicted equally well in the second region.

If during operation the data carrier portion 18 is registered by the camera of the reading and evaluating device 20, firstly the region of the data carrier portion bearing the information is identified on the basis of the reference marking. Then, the image produced by the camera is analyzed line by line, in order to establish whether a light or dark or coloured bit marking is present at a corresponding pixel location (combination of line and column), it being possible for different coloured bit markings to be provided to increase the information density. The line-by-line coding in the first region 24 is decoded according to a prescribed coding algorithm and the second region 26 is identified on the basis of the limit marking 28. The depiction of the second region 26 is compared with a depiction stored in a memory of the item of equipment 10, whereupon, if the comparison shows identity of the stored depiction with the registered depiction of the data carrier 18, an authenticating signal is generated in the item of equipment 10, which in the present example allows the auxiliary substance 14 for the carrying out of an analysis and consequently makes the analysis possible. If, on account of a lack of coincidence, no authenticating signal is generated, an error message is issued on the item of equipment 10 and its operation is inhibited for the auxiliary substance 14.

Represented in Figure 3 is a block diagram which shows the basic structure of the system according to the invention for identification and authentication. The optical signal picked up by the lens 22 of the camera 21 from the data carrier portion 18 is converted in the camera 21 into an electronic image signal in a conventional way. The electronic image signal is read out, for example line by line, in a reading-out device

41 and decoded in a downstream decoding device 42, using a prescribed decoding algorithm. The information thus obtained is passed on to a comparison device 43, in which this information read out from the data carrier portion 18 is compared with an item of information stored in a memory device 44.

If the read information coincides with the stored information, an enabling signal is sent from the comparison device 43 to an enabling controller 46, which thereupon enables a functional component 48 of the item of equipment 10, so that the item of equipment 10 is ready to operate.

If the comparison of the read information and the stored information in the comparison device 43 does not lead to coincidence of the two items of information, a blocking signal is sent from the comparison device 43 to the enabling controller 46, which thereupon disables the functional component 48 of the item of equipment, so that the equipment is not ready to operate, and an optical and/or acoustic signal is triggered in order to indicate to the operator of the item of equipment 10 the lack of operational readiness of the equipment.

The functional component 48 may be, for example, a power supply or an open-loop and/or closed-loop control device for the item of equipment 10 or for part of the item of equipment 10.

The invention is not restricted to the above exemplary embodiment, which merely serves for a general explanation of the essential idea of the invention. Rather, the device according to the invention can, within the extent of protection, also assume configurations other than those described above. The device may in this case have in particular features which represent a combination of the respective individual features of the claims.

For example, a mirror-reflex camera or a video camera can also be equipped with a reading and evaluating device according to the invention and the interchangeable lenses for this camera could be provided with a data carrier portion according to the invention, in order to permit only the use of original lenses of the camera manufacturer on this camera.

Reference numerals in the claims, the description and the drawings serve merely for better understanding of the invention and are not intended to restrict the extent of protection.